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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/702,416

11/06/2003

Daniel C. Edelstein

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EXAMINER

ABOAGYE, MICHAEL

ART UNIT

PAPER NUMBER

1725

MAIL DATE

DELIVERY MODE

09/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/702,416	Applicant(s) EDELSTEIN ET AL.	
	Examiner Michael Aboagye	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi et al. (US Patent No. 6,472,304) in view of Sakane et al. (JP 56-017048).

Regarding claims 1-5 and 21, Chittipeddi et al. teaches a structure formed by bonding an integrated circuit to a substrate comprising: a substrate ("11", figure 1) a gold wire ("61", figure 20) a copper interconnect ("13", figure 1 or "44", figure 21) within said substrate (abstract) and a barrier layer deposited on said metallic interconnect ("74", figure 21), (abstract; column 3, lines 44- 67 and column 4, lines 3-12). The intended operating conditions are noted, however, said intended operating conditions do not patentably distinguish said claimed features over the prior art.

Chittipeddi et al. does not expressly teach depositing on said metallic interconnect comprising alloying metals other than the gold wire and forming a low temperature alloy material including Au-Sn or Au-In between the gold wire and the alloy metal.

However, Sakane et al. teaches a semi conductor assembly having, a metallic interconnect (note the examiner interprets the copper material forming the lead frame as

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the copper interconnect) depositing a metallic alloy made of Ni-Sn on the surface of the lead frame; wherein said metallic alloy (Ni-Sn) and the gold wire combine to form a low temperature alloy including Au-Sn; wherein the gold wire is connected to the leadframe by thermocompression to the lead frame. The benefit of said alloying metal (Ni-Sn) is to prevent migration of species across the interconnect, reduces the risk of joint deterioration and thereby improving the integrity of the bonding process (Sakane et al. abstract). Note the Sn in the Au-Sn eutectic provides the lowering melting point; hence the limitations recited in claim 4 are met.

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to deposit Ni -Sn on the copper interconnect of Chittipeddi et al. as taught by Sakane et al. to enable the formation of Au-Sn alloy which prevents migration of species across the interconnect, reduce the risk of joint deterioration and thereby improving the integrity of the bonding process (Sakane et al. abstract).

Response to Arguments

3. The examiner acknowledges the applicants' amendment received by USPTO on August 21 2007, Claims 1-5 and 21 remain under consideration in the application.

4. Applicant's arguments filed August 21 2007 have been fully considered but they are not persuasive.

In response to the applicant's argument about Chittipeddi et al., The examiner agrees with the applicant that Chittipeddi et al. does not teach an alloying metal deposit

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on the copper interconnect, however a barrier layer is deposited on the copper interconnect to avoid the readily reaction between the gold wire and the copper interconnect (see, column 1, lines 25-39 and column 2, lines 54-67).

Regarding the applicant's argument that Sakena does not teach the salient features of his invention. It is noted that Sakena et al. teaches a copper lead frame, with deposit of a metallic alloy made of Ni-Sn thereon; wherein said metallic alloy (Ni-Sn) and the gold wire combine to form a low temperature alloy including Au-Sn. It is further noted that in both Sakena and applicant's inventions said alloying metal is provided for the purpose of avoiding the formation of Cu-An alloy between the copper wire and the copper metallization. The examiner believes that Sakena et al. provides the remedy for the deficiencies of Chittipeddi et al. and that modification of the invention of Chittipeddi et al. in view of the teachings of Sakena et al. meets the applicant's claim structure.

Finally, it is noted that the references cannot be considered individually in showing nonobviousness where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Aboagye whose telephone number is 571-272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jonathan Johnson can be reached on 571-272-1177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



JONATHAN JOHNSON
PRIMARY EXAMINER

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Michael Aboagye
Assistant Examiner
Art unit 1725

09/17/2007